Small Business Innovation Research/Small Business Tech Transfer

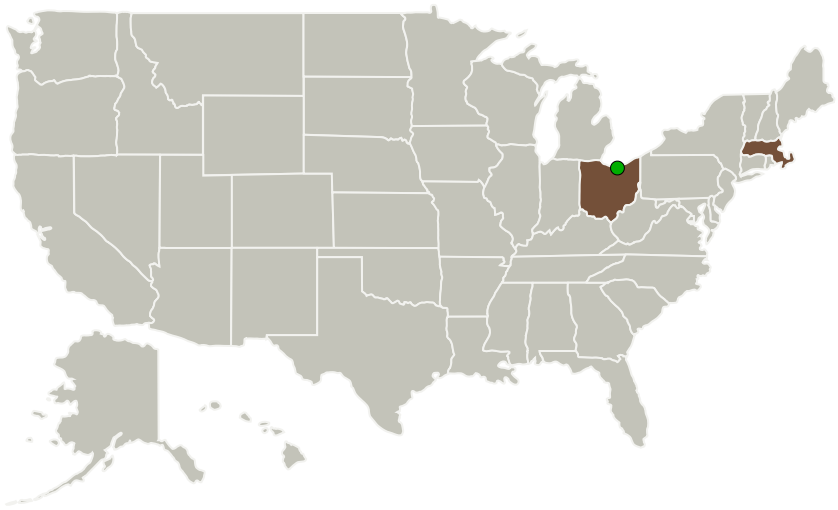
Green Liquid Monopropellant Thruster for In-space Propulsion, Phase II

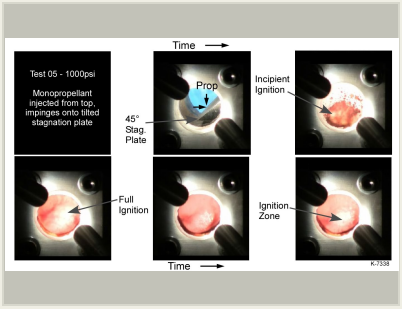
Completed Technology Project (2012 - 2015)

Project Introduction

Physical Sciences Inc. (PSI) and Orbitec Inc. propose to develop a unique chemical propulsion system for the next generation NASA science spacecraft and missions that is compact, lightweight, and can operate with high reliability over extended periods of time and under wide range of thermal environments. The system uses a new storable, low toxicity, liquid monopropellant as its working fluid. In Phase I, we have demonstrated experimentally the critical ignition and combustion processes for the propellant and used the data to develop thruster design concepts. Phase I work achieved TRL 3. In Phase II, we propose to develop and demonstrate in the laboratory a proof-of-concept prototype thruster. Phase II will achieve TRL 4+. We envision follow-on Phase II Enhancement (Phase II E) and Phase III programs to advance the TRL to 5 and 6, respectively. Phase III will be the development of a full-scale protoflight propulsion system applicable to a class of NASA missions. On both Phase II E and Phase III programs, we will collaborate with specific NASA programs and the industry to address the cost share component. Following a successful Phase III a space flight demonstration on a NASA mission will advance the TRL to 7.

Primary U.S. Work Locations and Key Partners





Green Liquid Monopropellant Thruster for In-space Propulsion Project Image

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Organizations Performing Work	Role	Type	Location
Physical Sciences, Inc.	Lead Organization	Industry	Andover, Massachusetts
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Massachusetts	Ohio

Project Transitions

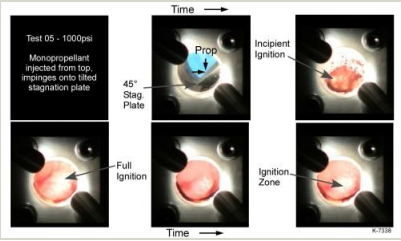
April 2012: Project Start

April 2015: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137386)*

Images



Project Image
Green Liquid Monopropellant Thruster for In-space Propulsion Project Image *(https://techport.nasa.gov/image/128716)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Physical Sciences, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Prakash B Joshi

Co-Investigator:
Prakash Joshi

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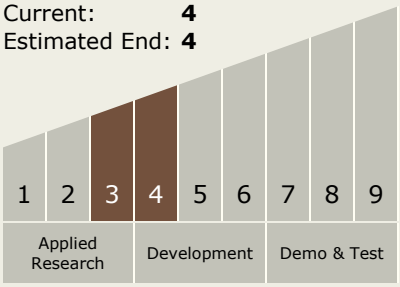
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.6 Gels

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System